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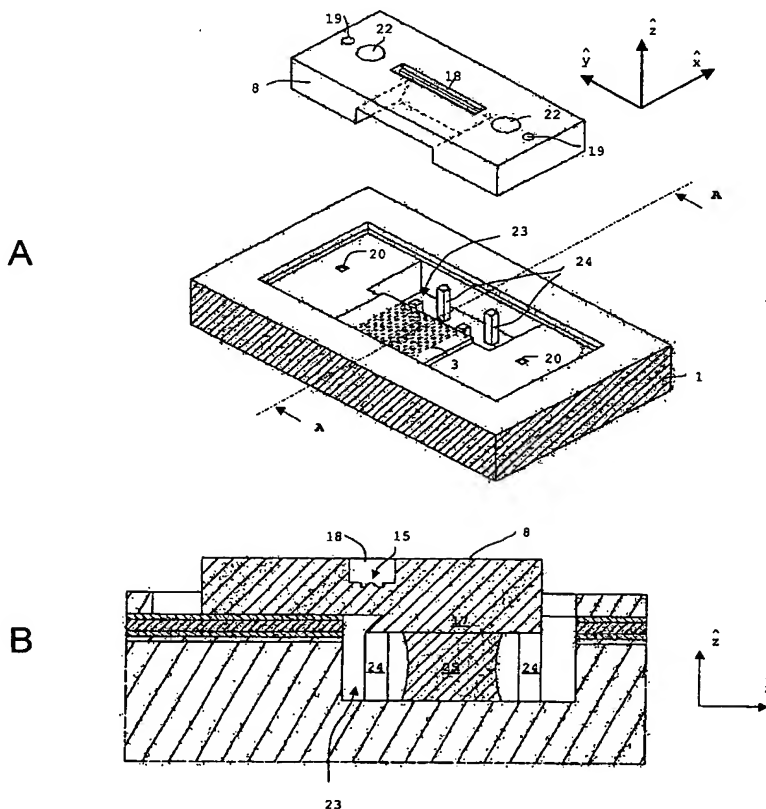
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[Continued on next page]

(54) Title: OPTICAL CONNECTOR ASSEMBLY, COUPLING DEVICE AND METHOD FOR ALIGNING SUCH A COUPLING DEVICE AND A WAVEGUIDE STRUCTURE



(57) Abstract: The invention relates to an optical connector assembly for optically connecting to a waveguide structure in a x-y plane of a layer stack, wherein the connector assembly comprises a coupling device providing a first optical path, and the waveguide structure provides a second optical path, deflecting from said first optical path. The coupling device comprises first reference means adapted to co-operate with second reference means in the layer stack, wherein the second reference means are adapted for aligning the coupling device to the waveguide structure in both the x- and y-direction of the x-y plane as to optically couple the first and second optical path. As a result an optical connector assembly is provided that improves the optical coupling between the optical path in a waveguide structure and in a coupling device and/or a mating optical device. The coupling device may comprise third reference means to couple an optical connector to the waveguide structure. The invention also relates to a method for aligning the coupling device and the waveguide structure.

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B. FIELDS SEARCHED

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Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ, INSPEC, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 236 788 B1 (MOISEL JOERG) 22 May 2001 (2001-05-22) abstract column 1, line 55 - column 2, line 6	1-12, 14, 15, 18-33
X	WO 96/07117 A (AKZO NOBEL NV ; DOBBELAERE PETER MARTIN CYRIEL (NL); DAELE PETER PA) 7 March 1996 (1996-03-07) abstract figures 2-4, 6, 7, 9, 10	1-34
X	US 5 345 524 A (LEBBY MICHAEL S ET AL) 6 September 1994 (1994-09-06) abstract; figures 1-5	1-35
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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	LINDEN VAN DER J E ET AL: "MICROMACHINED PHOTODIODE SUBMOUNT WITH INTEGRATED MIRROR FOR EFFICIENT OUT-OF-PLANE COUPLING TO PLANAR POLYMERIC WAVEGUIDE CIRCUITS" JAPANESE JOURNAL OF APPLIED PHYSICS, PUBLICATION OFFICE JAPANESE JOURNAL OF APPLIED PHYSICS. TOKYO, JP, vol. 37, no. 6B, June 1998 (1998-06), pages 3730-3735, XP000860818 ISSN: 0021-4922 -----	
A	YOSHIMURA R ET AL: "Low-loss polymeric optical waveguides with 45 degrees mirrors" 1997 6TH MICROOPTICS CONFERENCE AND 14TH TOPICAL MEETING ON GRADIENT INDEX OPTICAL SYSTEMS (MOC/GRIN), TOKYO, JAPAN, 7-9 OCT. 1997, vol. 37, no. 6B, 1997, pages 3657-3661, XP002236555 Japanese Journal of Applied Physics, Part 1 (Regular Papers, Short Notes & Review Papers), June 1998, Publication Office, Japanese Journal Appl. Phys, Japan ISSN: 0021-4922 -----	
A	EP 0 911 658 A (DAIMLER CHRYSLER AG) 28 April 1999 (1999-04-28) -----	
A	US 6 097 864 A (KROPP JOERG-REINHARDT) 1 August 2000 (2000-08-01) -----	
A	PATENT ABSTRACTS OF JAPAN vol. 010, no. 327 (P-513), 7 November 1986 (1986-11-07) & JP 61 133911 A (NIPPON TELEGR & TELEPH CORP), 21 June 1986 (1986-06-21) abstract -----	

INTERNATIONAL SEARCH REPORT

Information on patent family members

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Patent document cited in search report		Publication date		Patent family member(s)		Publication date
US 6236788	B1	22-05-2001	DE	19845227 A1		06-04-2000
			EP	0990931 A2		05-04-2000
WO 9607117	A	07-03-1996	WO	9607117 A1		07-03-1996
US 5345524	A	06-09-1994	JP	6337334 A		06-12-1994
EP 0911658	A	28-04-1999	DE	19746508 A1		29-04-1999
			EP	1312948 A2		21-05-2003
			EP	0911658 A1		28-04-1999
US 6097864	A	01-08-2000	DE	19711121 A1		01-10-1998
JP 61133911	A	21-06-1986	CA	1255382 A1		06-06-1989
			DE	3575208 D1		08-02-1990
			EP	0171615 A2		19-02-1986
			US	4735677 A		05-04-1988
			US	4750799 A		14-06-1988